broadcast channels and, at its option, have access through an interactive video channel to all of the video programmers or programming sources connected to the video dialtone network.[32/]

In an HFC network, there is not a limitation on the number of video programmers or video programming sources that can be supported. An HFC network with 200 (6 Mbps) digital interactive channels means that 200 channels of interactive channel capacity are available to serve the 500 subscribers served by a fiber/coax node. If more than 200 subscribers simultaneously access the digital interactive channel capacity, demand would exceed available capacity under the initial pre-expansion configuration. In such an HFC network configuration, saturation of digital interactive channel capacity does not occur until 40% of all subscribers simultaneously seek digital interactive capacity. Such a high early take rate for digital interactive video services is very unlikely, and if consumer demand for interactive video services does exceeds 40%, then the HFC network can be designed so that fiber/coax nodes serve fewer than 500 subscribers or by making more than 200 channels available for use by the 500 subscribers.[33/] BBT's claim that "HFC systems can support only limited-bandwidth interactive services and low take rates for such services before contention or blocking becomes a problem" is thus erroneous.[34/] Contrary to BBT's claims, the bandwidth of available interactive video services is not limited in HFC

[32/] The number of digital programming services from which consumers can select is unlimited in an HFC network.

[33/] If an HFC fiber/coax node serves 200 subscribers (or 200 digital converters), then all subscribers would be able to simultaneously access any and all digital interactive video programming services provided over the platform and contention and blocking would not be an issue because each subscriber would have a digital channel to use for selecting services from the digital services menu.

[34/] BBT's Comments at 15.

networks, and a 40% interactive video services take rate with the ability to expand to higher take rates would hardly be classified as a "low take rate."

Further, in an HFC approach, subscribers can receive analog video programming without incurring the expense of set-top converters. A converter is needed only for viewing interactive digital video services. On the other hand, while an all-digital video dialtone approach provides consumers the capability of receiving broadcast video programming and interactive video programming, the consumer would need to incur the additional cost and inconvenience of a set-top converter to view even the broadcast video programming.

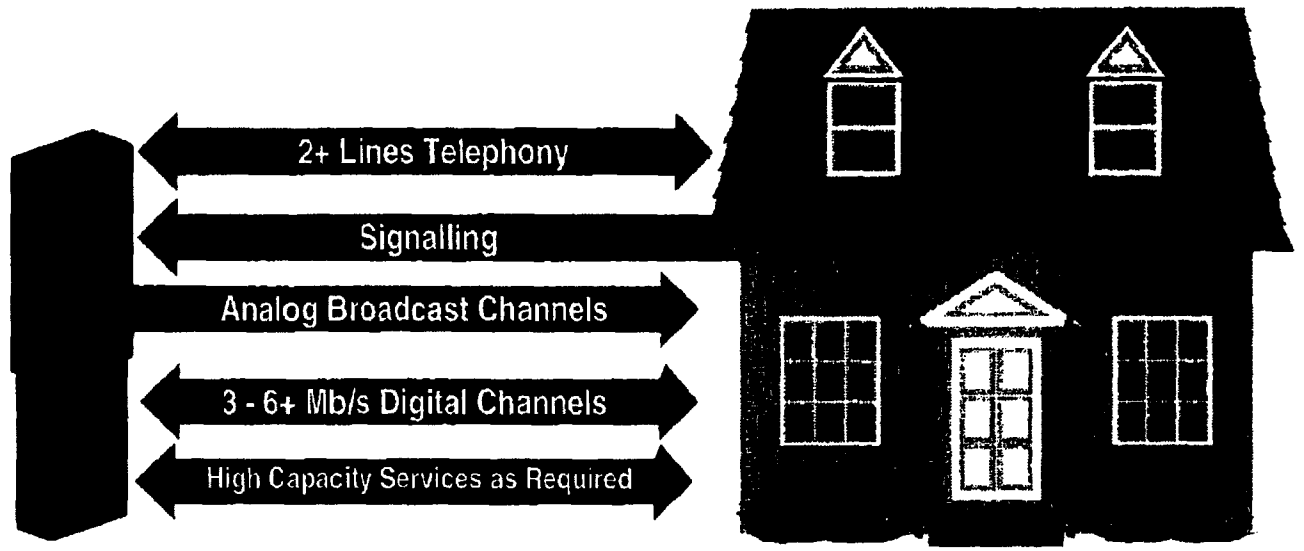
C. Besides Being Capable of Serving An Unlimited Number of Video Programmers, An HFC Network Is Capable of Delivering Both Analog Broadcast Video Programming and Digital Video Programming To Subscribers.

An HFC network architecture is ideally suited for today's video services marketplace. Unlike an FTTC approach, an HFC approach is capable of delivering both existing analog broadcast video services and future interactive video services to subscribers.

Services Supported	HFC	FTTC
Telephony/data	Yes	Yes
Analog broadcast video	Yes	No
Digital broadcast video	Yes	Yes
Interactive video	Yes	Yes

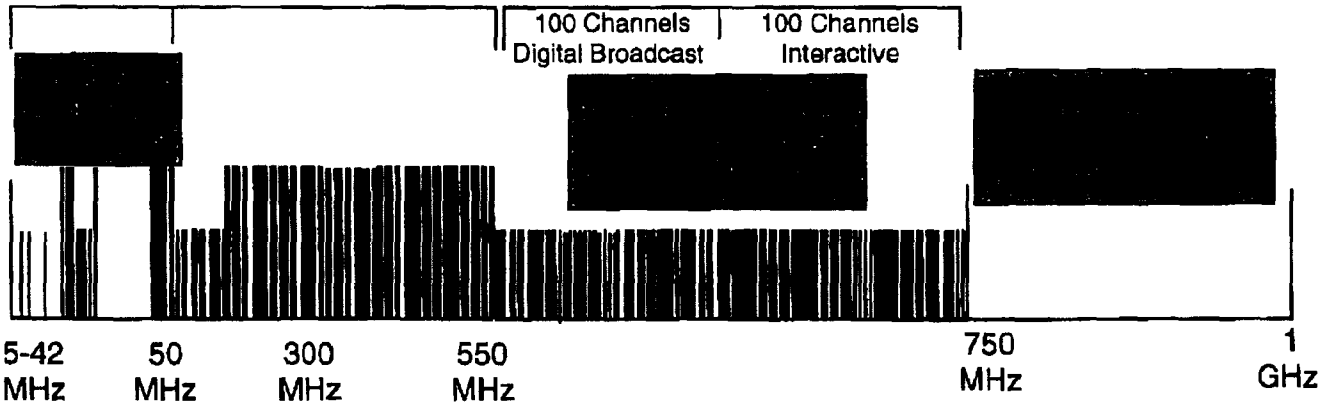
HFC systems deployed today typically provide video and telephony services over a 750 MHz bandwidth. This means that an HFC network can simultaneously support approximately 80 analog broadcast video services, 200 (6 Mbps) digital interactive video

Services Available to the Home



80 VSB-AM & FM Band TV Channels

200 Compressed 6MB/S Digital Channels (VSB or QAM)



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services, and telephony/data services, or some other combination of services (*see* Figure 1: Allocation of Bandwidth To Services Using An HFC Network).

D. An HFC Approach Is the Most Cost-Effective Method Of Delivering Video Services To Consumers in Today's Video Environment.

The fundamental issue confronting the LECs as they prepare to enter the video marketplace is: what is the most cost-effective way to build a broadband infrastructure that is capable of serving existing analog video services as well as future interactive video services. Based upon the more than 30 video dialtone applications filed to date, the best solution now available is the HFC approach, not an all-digital FTTC approach.

First, an FTTC approach requires consumers to purchase or lease set-top converters to view *any* video programming. Consumers with multiple television sets would therefore need multiple set-top converters. In contrast, an HFC approach allows consumers to view analog video programming without a set-top converter; only those subscribers that wish to receive interactive digital video programming are required to purchase or lease set-top converters and only for those television sets that will receive the interactive programming. Consumers will therefore potentially save a significant amount of money from an HFC approach. If, for example, a video dialtone system serves 100,000 households, the average household has 1.5 television sets, 5 percent of the television sets wish to receive interactive video services, and an FTTC set-top converter costs $250, then consumers served by an FTTC network would be forced to pay over $35 million for set-top converters. Under the same scenario, customers served by an HFC network would pay less than $3 million for set-top converters.[35/]

[35/] This amount assumes an HFC set-top converter costs $300.

Second, the cost of placing fiber optic facilities closer to the home makes FTTC not cost-effective for delivering video services. For example, as indicated in Figure 2, even assuming a network is only used for interactive digital video services (no analog) and fiber nodes (*i.e.*, Optical Network Units ("ONUs")) serve 48 subscribers, the cost per home passed using an HFC network is less expensive than switched digital video (*i.e.*, FTTC) until the interactive services penetration exceeds 25%. If fiber is placed closer to the home so that fiber nodes serve 24 subscribers, an HFC network is less expensive than an FTTC approach until the interactive services penetration exceeds 50%.

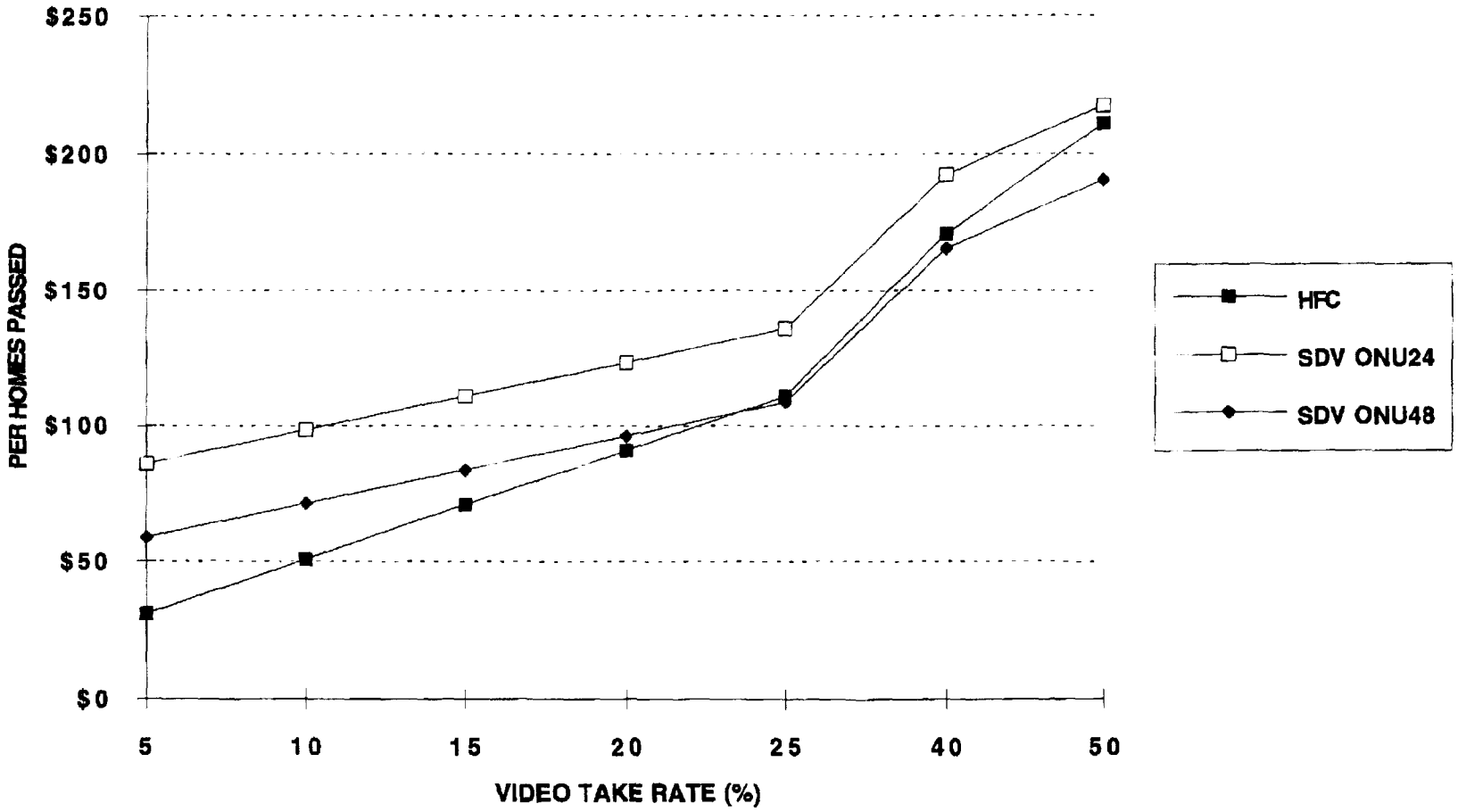
In sum, the most cost-effective approach to providing video services is an HFC approach, which is able to support both analog and digital services and allows for the migration to an all-digital network as the demand for digital services increases.

E. An HFC Approach Supports Existing and Emerging Standards and Open Interfaces.

An HFC approach to providing video services uses RF carriers to carry video or telephony information. Each carrier is independent, allowing totally dissimilar signals to be transmitted together. Thus, over time, an HFC system provides the LECs the flexibility to carry on one carrier an AM/VSB analog signal, on another carrier an MPEG-2 digital signal, and on a third carrier an asynchronous transfer mode ("ATM") signal. In contrast, specific rules regarding formats, rates, and protocols must be established in an all-digital approach, and until digital compression and transmission standards are adopted and fully-implemented, there will be

Figure 2

HYBRID FIBER COAX SYSTEM AND SWITCHED DIGITAL VIDEO, VIDEO ONLY COMPARISON EQUIPMENT ONLY TO SUPPORT INTERACTIVE SERVICES



compatibility and cost issues related to an all-digital approach.[36/] Prior to the resolution of these issues, both LECs and consumers will be understandably hesitant to make the required substantial investment in an all-digital system. This is particularly true given the "all-or-nothing" approach of an all-digital platform, whereby no subscriber an elect the service without acquiring a set-top converter. In contrast, HFC is already a mature technology, requires a smaller LEC investment, and gives consumers a choice of services.

F. An HFC Approach Allows The LECs To Segregate The Costs Associated With Providing Both Video and Telephony Services Over The Same Network.

Use of an HFC approach also facilitates regulatory compliance in the separations area. In a competitive environment, the LECs must be able to segregate their costs of providing different services. An HFC approach allows the LECs to isolate the direct costs of providing a service and also identify any common costs associated with providing that service as well as other services. In contrast, with an all-digital approach, telephony and video services are highly integrated and the respective costs of providing video and telephony services can not be clearly defined. Further, using an HFC approach, the costs of providing telephony/data services are truly incremental, whereas, in an integrated digital approach, the initial cost burden of providing video services includes, to a certain degree, telephony/data capabilities that may not necessarily be initially required.

36/ *See* Comments of Compression Labs, Inc. and Consumer Electronics Group of the Electronics Industries Association ("EIA/CEG").

Today's regulatory and competitive services environment requires the ability to clearly identify and separate video and telephony costs so that these costs can be match against revenues. An HFC approach allows LECs to successfully compete in a competitive video services market.

G. An HFC Approach Meets The Requirements of Today's Video Marketplace And Provides For The Migration To An All-Digital FTTC or FTTH In The Future.

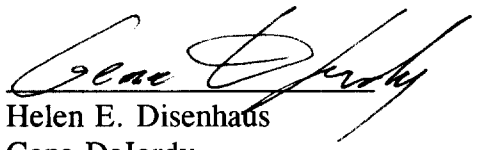
Today's video marketplace is analog. There are roughly 93 million television households in the United States, and the average household has about two television sets. With an all-digital video dialtone approach, all of these television sets would require set-top converters to receive a digital signal. This implies a price tag of billions of dollars just for set-top converters.

A principal advantage of HFC is that it allows the LECs to support existing video services and permits the LECs to migrate to an all-digital approach, whether FTTC or FTTH, when demand for interactive services justifies such an approach. An HFC approach supports all existing and emerging narrowband (*i.e.*, telephony) and broadband (*i.e.*, video) services, and offers a simple, direct migration path to a all-digital network, if such a network becomes economically and operationally justified.

V. CONCLUSION

Although an all-digital approach may make business sense in certain situations now or in the future, as a policy matter, the Commission should not uniformly impose a specific technology for the delivery of video dialtone services. Rather, the Commission's role should be to define the requirements of video dialtone, such as sufficient capacity to serve multiple video programmers, and let the LECs determine what technology should be used to meet these

requirements. Some LECs may well decide to use digital technology to provide video dialtone service. Other LECs, as we have seen, will use a combination of analog and digital technology to provide video dialtone service. While ADC is strongly committed to its HFC technology, and believes its suitability for current video dialtone services is well-established, ADC does not urge the Commission to order its deployment. Rather, ADC urges the Commission to maintain its successful technology-neutral video dialtone approach and allow marketplace forces to determine its deployment. To ensure the continued development of video dialtone, the Commission must not adopt one technology rather than another.



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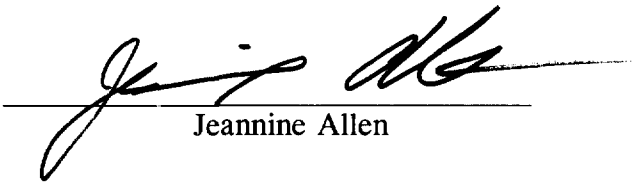
CERTIFICATE OF SERVICE

I hereby certify that on this 17th day of January, 1995, copies of Reply Comments of ADC Telecommunications, Inc. were served by first- class mail, postage prepaid, on all parties on the official service list.



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